REMARKS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-7, 9-13, and 16-19 are presently active in this case.

In the outstanding Official Action, Claims 1-7, 9-13, 16, and 17 were rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention. Specifically, the Official Action indicates that there is insufficient support for the limitation of an impeller having a shape and size varied in a vertical direction, which variation achieving vertical flow of the yeast slurry." The Applicants respectfully traverse this rejection.

The standard for determining whether the specification meets the enablement requirement is whether one skilled in the art could make or use the invention from the disclosures in the application without undue or unreasonable experimentation. (See MPEP 2164.01.) In fact, the Federal Circuit has stated that a patent need not teach, and preferably omits, what is well known in the art. (See *In re Buchner*, 929 F.2d 660, 661, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991) and MPEP 2164.01.) The test of enablement is not whether any experimentation is necessary, but whether, if experimentation is necessary, is it undue. (See *In re Angstadt*, 537 F.2d 498, 504, 190 USPQ 214, 219 (CCPA 1976) and MPEP 2164.01.)

The specification describes on page 11, lines 18-21, a stirring impeller having blades each of which "...have a shape, size and mounting means more variable in a vertical

orientation ... thereby achieving vertical flow of the slurry through such variations." The specification describes in detail several embodiments of such an impeller, for example, as depicted in Figures 1 and 4. Thus, the present application clearly provides enabling disclosure of such limitations that enable one skilled in the art to make and use the invention from the disclosures in the application without undue or unreasonable experimentation. Accordingly, the Applicants respectfully request the withdrawal of the enablement rejection.

Claims 1-3, 9, 16, and 18 were rejected under 35 U.S.C. 102(b) as being anticipated by Mogi (JP 10-180228). Claims 4-7, 10-13, 17, and 19 were rejected under 35 U.S.C. 103(a) as being unpatentable over Grylls et al. (U.S. Patent No. 4,188,407) in view of Mogi. For the reasons discussed below, the Applicants respectfully traverse these art rejections.

Claim 1 recites a stirring impeller made up of vertically oriented surfaces with <u>no slant surface</u> and Claim 18 recites a stirring impeller including vertically flat surfaced paddle blades with <u>no slanting surfaces</u>. The Mogi reference clearly does not disclose such a feature, and the Official Action provides no discussion about how such a feature is disclosed in the Mogi reference.

The Mogi reference depicts an agitating shaft (2) furnished with plural impellers or stirring aerofoils (3) at regular intervals in the axial direction. As seen in Figures 2 and 3 and as described in paragraphs [0028] and [0029], the impellers have a top face (3a), tongue section (3b), an obtuse angle ramp (3c), and a tube part (3d). As can clearly be seen in Figure 3 (which is rotated 90° counterclockwise from vertical), none of the surfaces of the stirring aerofoils (3) are vertically oriented or flat. Specifically, in the description, paragraph [0028]

of the Mogi reference, each stirring impeller (3) has, as illustrated in Figures 2 and 3, an upper surface (3a) slanting at a predetermined angle in a forward direction (i.e., a clockwise direction in Figure 2) of a stirring shaft (2), a plate-like shape having a width gradually becoming smaller as it radially outwardly advances from the stirring shaft (2), a lower surface (3b) oriented at an acute angle with respect to the upper surface (3a) and slanting in the same direction as the slanting direction of the upper surface (3a) at an angle smaller than the slanting angle of the upper surface (3a) or rather lies substantially in a horizontal orientation, and an acutely slanting portion (3c) connecting a rear end edge of the upper surface (3a) of the forward direction with the lower surface (3b). According to this description, the device described in the Mogi reference has plural stirring impellers each having a slant surface and a very short length in a vertical direction (a direction parallel to the stirring shaft 2) so that each impeller has substantially no vertically oriented surface. The stirring aerofoils (3) clearly have slanting surfaces, as is evident from a review of the top face (3a) in Figure 3 and which is described in paragraph [0028] as being inclined at a predetermined angle.

Accordingly, the Mogi reference clearly does not anticipate Claim 1, which expressly recites a stirring impeller made up of vertically oriented surfaces with no slant surface. Furthermore, the Mogi reference clearly does not anticipate Claim 18, which expressly recites a stirring impeller including vertically flat surfaced paddle blades with no slanting surfaces. Thus, *for at least these reasons*, the Mogi reference does not anticipate Claims 1 and 18, or the claims that depend from Claim 1.

Additionally, the Applicants submit that the Mogi reference does not disclose <u>a height</u>

of a rotation body that is 70% or more of a depth of the part of yeast slurry stored in the stirred tank, as recited in independent Claims 1, 4, 18, and 19.

The Official Action indicates that "[i]t appears from Mogi's figure 1 that the top impeller is at a position that is approximately 75% of the height of the tank. Additionally, the vessel would not be filled to the top. Therefore, the height of the impeller would clearly extend beyond 70% (up to 120%) of the depth of the material." The Applicants note, however, that in the claims of the present application, the "height" is not for the top of the impeller, but for the rotational body defined by the rotation of the stirring impeller. That is, unless the height of the rotation body defined by the rotation of the stirring impeller is 70% or more of a depth of a part of yeast slurry stored in the stirred tank, it is hard to sufficiently stir yeast slurry stored in the tank. Herein, the height of the rotation body defined by the rotation of the stirring impeller is meant as described in the specification, for example, on page 9, lines 8-10, which reads "[b]y the height H_1 of the rotation body is meant herein a distance between the upper end of the rotation body defined by the rotation of the stirring impeller 5 and the lower end thereof...." For making clear this definition, we attached hereto a copy of Figure 4 as Reference Illustration 1.

As is apparent from Reference Illustration 1, the "height of the rotation body" is based on a three-dimensional figure without portions such as clearances, which is defined by the rotation of the stirring impeller. If such clearances exist, yeast slurry is hard to be sufficiently stirred at such clearances. In this respect, for comparison with the device of the Mogi reference, we attached hereto Reference Illustration 2 that illustrates only a body of the

device in Figure 1 of the Mogi reference. As is apparent from Reference Illustration 2, there is provided no stirring impeller continuously formed in the vertical direction in the Mogi reference. Instead, the Mogi reference only depicts a total of seven stirring impellers (3) each having a small height in the vertical direction. The rotation of these thin stirring impellers (3) defines not a single rotation body continuous in the vertical direction as in the present invention, but defines the total of seven thin disc-like rotation bodies, as assumed from Reference Illustration 2.

In relationship with the present invention, when a portion which can actually stir yeast slurry by the rotation body is considered, the height H_1 of the rotation body defined by the rotation of the stirring impellers of the Mogi reference is defined by: $H_2 = H_A + H_B + H_C + H_D + H_E + H_F + H_G$.

On the other hand, H_2 illustrated in Figure 4 of the present application is a depth of a part of yeast slurry stored in the stirred tank. This depth H_2 of the part of yeast slurry is illustrated in Reference Illustration 2 on the assumption that the device of the Mogi reference, which is originally designed for the treatment of garbage, is used in a stirred tank for storing yeast slurry such as beer as in the present invention.

According to the present invention, the height of the rotation body defined by the rotation of the stirring impeller is 70% or more of a depth of the part of yeast slurry stored. This means that $H_1 / H_2 X 100 \geq 70$. When $H_1 / H_2 X 100$ is calculated based on Reference Illustration 2 which illustrates the device of the Mogi reference;

$H_1 / H_2 X 100$

$= (H_A + H_B + H_C + H_D + H_E + H_F + H_G) / H_2 \times 100$

= 19.

That is, even if it is assumed that the device of the Mogi reference is used in the stirred tank for storing yeast slurry such as beer, the height of the rotation body defined by the rotation of the stirring impeller is only about 19% of a depth of the part of yeast slurry.

The difference between the present invention and the Mogi reference can be seen in tests made by the present inventors. Specifically, the present inventors made flow analysis on yeast slurry. Reference Illustrations 3 and 4 which show the test results are attached hereto. Reference Illustration 3 is a flow analysis diagram, in which the shearing velocity distribution of the stirring impeller within the stirred tank is represented by color computer graphics. It is possible to determine the flowing status of yeast slurry in each region of the stirred tank based on the color distribution. This flow analysis diagram was prepared for each of the stirring impeller used in the embodiment and examples of this application (References 3-A, 3-B), and comparative examples with two turbine impellers (References 3-C, 3-D).

Further, the present inventors have prepared a flow pattern diagram like Reference 4 based on a flow analysis diagram illustrated by such as the above color computer graphics. In a front view and a plan view of this flow pattern diagram, the velocity vector of the shearing velocity is illustrated. In a case where no plots of velocity vector exist, it indicates that yeast slurry does not flow at all. As a stirring impeller of the present invention, an impeller which has an impeller diameter (a maximum diameter of the rotation body defined by the rotation of the stirring impeller) of about 83% of the inner diameter of the stirred tank

(a tank diameter) (views on the left-hand side of Reference Illustration 4), and the stirring was performed at a rotation speed of 10 rpm. On the contrary, for the comparative example, the ratio of the impeller diameter was 50% of the tank diameter (views on the right-hand side of Reference Illustration 4), and the stirring was performed at a rotational speed of 60 rpm.

With the stirring impeller used in the example of the present application, plots of velocity vector are distributed across the entire region of the stirred tank as can be seen both in the front and plan views. On the contrary, for the case with the two turbine impellers, there is a portion with no plots both in the plan and front views. The portion with no plots indicates that yeast slurry does not flow at all, while being substantially kept stationary. For example, in a middle portion where the two turbine impellers of the comparative example are not located, a portion with no plots of velocity vector greatly occupies, which indicates that yeast slurry does not flow at all while being kept stationary.

Thus, in comparison between the flow patterns of the present invention and the comparative example in the plan and front views, it will be easily appreciated such as from the correlation between the position of the stirring impellers and the portion with no plots in the flow pattern that the presence or absence of plots of velocity vector depends not on the difference in height of the top of the impeller, but the difference in the height H_1 of the rotation body defined by the rotation of the stirring impeller as described above.

In the front view of the comparative example with the two narrow impeller blades located at different heights, when H_1 / H_2 X 100 is calculated in the same manner as the case of the Mogi reference, the total of the heights (a vertical length) of the two impellers in the

comparative example is only about 13% of the depth of the part of yeast slurry.

On the contrary, when the size is measured based on the formula of H_1 / H_2 X 100 as described in Figure 4 of the present application with reference to the front view of the Reference 4, the height of the rotation body of the stirring impeller is about 91% of the depth of the part of yeast slurry in the front view of the Reference 4. From this, it is apparent that a significant difference exists in the flowing state of yeast slurry. Accordingly, even if a device such as the device of the Mogi reference is used as a stirred tank for storing yeast slurry such as beer, it is easily appreciated that yeast slurry can be uniformly mixed and stirred within the stored tank, as can also be seen from the tests.

From the above reason, it is apparent that the Mogi reference merely teaches that only the top impeller is at a position that is approximately 75% of the height of the tank, and therefore does not disclose that the height of the rotation body defined by the rotation of the stirring impeller is 70% or more of the depth of the part of yeast slurry, as is recite din independent Claims 1, 4, 18, and 19 of the present application..

Accordingly, the Mogi reference clearly does not teach all of the limitations recited in Claims 1, 4, 18, and 19, and therefore does not anticipate these claims. Thus, *for at least these reasons*, the Mogi reference does not anticipate Claims 1, 4, 18, and 19, or the claims that depend from Claims 1 and 4.

Furthermore, the Applicants submit that the Mogi reference does not disclose <u>a jacket disposed on a periphery of the tank body within which a cooling medium is circulated so as to cool the yeast slurry</u>, as recited in independent Claims 1, 4, 18, and 19.

The Official Action acknowledges that the Mogi reference does not disclose a jacket within which a cooling medium is circulated. Yet, the Official Action maintains an anticipation rejection of Claims 1, 4, 18, and 19, by stating that "the jacket of Mogi is capable of containing a cooling medium without variation to the structure...." However, clearly it would require modification of the structure disclosed in the Mogi reference to provide cooling medium, since the device described therein is configured to heat rather than cool. Such a rejection seems to be more of an obviousness rejection than an anticipation rejection, and the Applicants submit that such a modification of the structure would be contrary to the teachings of the Mogi reference, and therefore one of ordinary skill in the art would not have been motivated to make such a modification absent hindsight considerations.

The Official Action indicates that "Mogi discloses ... a jacket (33) disposed on a periphery of the tank body, ..." However, as described in the paragraph [0040] of the specification of the Mogi reference, the jacket (33) of the Mogi reference is of a double structure where the heater is incorporated, which jacket is designed to heat a material to be treated after pressure dehydration. The device of the Mogi reference is originally designed as a garbage treatment device and therefore requires pre-pressure dehydration before discharging the material to be treated to the outside of the device. After the pressure dehydration, the stirring impeller (3) rotates so as to dry the material, while heating the material by the heating jacket (33) incorporated into the heater. These are described in the paragraph [0040]. Thus, according to the device of the Mogi reference, which is originally designed as a garbage treatment device, the heating jacket is necessitated to heat garbage and

dry the same by rotating a stirring impeller for finally discharging the treated garbage. Contrarily to this, the jacket of the preset invention is to cool yeast slurry stored in the tank and therefore is greatly different from the heating jacket of the Mogi reference, where the heater is incorporated.

More specifically, the stirred tank for storing yeast slurry, which the present invention is directed to, is to store yeast slurry under a lower temperature so as to prevent increase of activity of yeast until fermentation, where the activity of yeast is required for fermentation. As described in the description of the present application (page 18 lines 22-26), the storage temperature of yeast slurry is controlled according to a time chart, so that a cooling medium is circulated within a jacket on the periphery of the stirred tank to cool the yeast slurry within the stirred tank until the temperature of the yeast slurry reaches a preset temperature. Figure 13, which illustrates the result of Example 6 relating to this disclosure, indicates the control of the temperature to about 0.5-2°C. In actual use, the control of the temperature to such a range is required. Thus, the stirred tank of the present invention inherently requires cooling of yeast slurry, and therefore is greatly different from the heating jacket (33) incorporated into the garbage treatment device of the Mogi reference.

Thus, the jacket of the present invention, which is designed to circulate a cooling medium, is greatly different in function and intended use from the heating jacket of the Mogi reference with the heater incorporated therein. Thus, the Applicants submit that not only does the Mogi reference not teach this limitation recited in Claims 1, 4, 18, and 19, but also the Mogi reference does not suggest or provide a motivation for modifying the device

described therein to include such a feature. Thus, *for at least these reasons*, the Mogi reference does not anticipate Claims 1, 4, 18, and 19, or the claims that depend from Claims 1 and 4.

The Official Action further rejects independent Claims 4 and 19 based on the combination of the Grylls et al. reference and the Mogi reference.

The Applicants submit that the Grylls et al. reference does not supplement the deficiencies in the teachings of the Mogi reference described in detail above with respect to Claims 4 and 19. For example, the rod (6) of the Grylls et al. reference clearly does not teach a stirring impeller that is made up of vertically oriented surfaces with no slanting surface, as recited in Claim 4 of the present application, and a stirring impeller that includes vertically flat surfaced paddle blades with no slanting surface, as recited in Claim 19. The Grylls reference indicates that blades, rods, or bars can be used as a mechanical disintegrator of simple rectangular or circular cross-section, but specifically notes that the blades "should be twisted out of horizontal." (Col. 5, lines 13-16.) Such a twisted shape is similar to the teaching in the Mogi reference, as discussed above. Clearly such a teaching provides slanted surfaces. Thus, the Applicants respectfully submit that a *prima facie* case of obviousness has not been established in the present case base upon the combination of the Grylls et al. reference and the Mogi reference because the references, either taken alone or in combination, do not teach or suggest all of the claim limitations. (See MPEP 2143.)

The Official Action indicates that the Grylls et al. reference discloses a method including storing in a stirred tank a part of yeast slurry discharged from fermentation tanks

where beer is fermented, and then returning the part of yeast slurry from the stirred tank to the fermentation tanks for reuse. However, the Grylls et al. reference neither teaches nor suggests the fermentation of beer. Even in column 3, lines 41-55, which was cited in the Official Action, no disclosure is made for the fermentation of beer. The device described in the Grylls et al. reference is designed not to stir yeast slurry such as beer in the present invention, but to stir dried yeast particles. Even in the description of Examples 1 and 2 of columns 6 and 7, the disclosure is made only on the fermentation of bread.

An additional difference of the device of the Grylls et al. reference lies in that it has not a stirring impeller but a stirrer rod (6). A stirring device described such as in the Grylls et al. reference performs stirring by a stirrer rod and therefore is impossible to stir slurry such as beer unlike the present invention, although it can stir dried yeast as material of bread. Another difference lies in that the device of the Grylls reference makes yeast flow by introduction of air from the lower portion of the stirring device, while the tank of the present invention does not require such an introduction of air.

Due to the difference in targets to stir, that is, yeast slurry such as beer and dried yeast particles, the structure of the Grylls et al. reference is greatly different in structure from the present invention. It is to be noted that in actual use, it is unlikely to employ a device, which has a stirrer rod for stirring and performs introduction of air, for use in stirring and storing yeast slurry, which is mainly for beer fermentation.

Accordingly, the Applicants submit that a *prima facie* case of obviousness has not established with respect to Claims 4 and 19, or the claims that depend from Claim 4, based on

the proposed combination of the Grylls et al. reference and the Mogi reference. Thus, the Applicants respectfully request the withdrawal of the obviousness rejection of Claims 4 and 19.

Consequently, in view of the above discussion, it is respectfully submitted that the present application is in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully Submitted,

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